REMARKS

This application has been reviewed in light of the Office Action dated June 17, 2003. Claims 1-26 are in the application; claims 19-26 have been withdrawn from consideration by the Examiner. Claims 1-18 are now presented for examination. Claim 1 has been amended to more particularly point out and distinctly claim the subject matter regarded as the invention. Claim 1 is the only independent claim now under consideration. Favorable review is respectfully requested.

The Examiner stated that the title was not descriptive of the invention. The Examiner also objected to the abstract. The specification has been amended to include a revised title and a new abstract. Withdrawal of the objections is therefore respectfully requested.

The claim has been amended to explicitly recite that in the annealing step, a first silicide layer and a second silicide layer are formed; the first silicide layer includes the element (selected from Co, W, Ta and Mo) and is in contact with the substrate; the second silicide layer includes titanium and the element, and overlies the first silicide layer. This claim amendment is supported in the specification at least at page 13, lines 3-17, and Figure 9.

Claims 1-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Rathore et al. (U.S. Pat. No. 6,069,068) in view of Farahani et al. (U.S. Pat. No. 5,612,253). The applicants respectfully submit that amended independent claim 1 is patentable over the art cited by the Examiner, for the following reasons.

The present invention, as defined in claim 1, is directed to a method including the step of depositing a multilayer structure on a semiconductor substrate; the first and third layers include titanium and the second layer includes an element selected from the group consisting of cobalt, tungsten, tantalum, and molybdenum. The method also includes the step of annealing the substrate and the structure in a nitrogen-containing atmosphere, to form a first silicide layer including the element in contact with the substrate and a second silicide layer including titanium and the element overlying the first silicide layer.

It is thus a feature of the present invention that layers of silicide are formed by the annealing step, and furthermore that the second silicide layer includes titanium and the element deposited in the second layer (selected from Co, W, Ta and Mo).

Rathore et al. describes a multilayer deposition process in which a layer possibly including titanium is deposited on the substrate, and an optional layer which may include Ta or W is deposited on the first layer. As noted by the Examiner, Rathore et al. does not teach or suggest any annealing process. In particular, Rathore et al. does not suggest any process in which a silicide is formed.

Farahani et al. is understood to disclose a method for forming a trilayer structure including titanium, titanium nitride and titanium silicide by using a three-step annealing process. Farahani et al. does not suggest forming a silicide which includes titanium and another element, as in the present invention. In particular, Farahani et al. does not suggest forming a second silicide layer overlying the first silicide layer, where the second silicide includes titanium and an element selected from the group consisting of Co, W, Ta and Mo. Accordingly, Farahani et al. does not disclose or suggest the above-described features of the present invention.

With regard to a combination of the references, "obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art." MPEP § 2143.01. Rathore et al. is concerned with forming a copper intermetallic from the top layer (the last-deposited layer 7; col. 8, lines 33-37). Farahani et al., by contrast, is concerned with forming a nitride layer by annealing in a nitrogen-containing atmosphere. There is no suggestion in Rathore et al. that an annealing step is desirable after a three-layer deposition; furthermore, Rathore et al. does not suggest that formation of either a silicide or a nitride is desirable. On the other hand, there is no suggestion or motivation in Farahani et al. to deposit over the titanium an additional layer including any of Co, W, Ta or Mo. It follows that Farahani et al. does not offer any motivation to form a silicide layer containing such an element.

If the deposition sequence of Rathore et al. were in fact combined with the annealing steps of Farahani et al., the result would be a process for depositing a three-layer structure on a substrate (layers 5, 6 and 7 of Rathore et al.), followed by nitridation of the upper layer as taught by Farahani et al. This would render the upper layer unsuitable for forming a copper intermetallic (the desired result according to Rathore et al.). This in turn means that the required motivation to combine the references is lacking: "If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." MPEP § 2143.01; *In re Gordon*, 733 F.2d 900 (Fed. Cir. 1984).

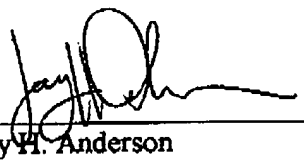
Accordingly, it is submitted that the cited references should not be combined as a reference against the present invention. It follows that the present invention would not have been obvious therefrom.

The other claims presently under consideration in this application are each dependent from the independent claim discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, the applicants respectfully request favorable consideration and early passage to issue of the present application.

The applicants' undersigned attorney may be reached by telephone at (845) 894-3667. All correspondence should continue to be directed to the below listed address.

Respectfully submitted,



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